EXHIBIT A

Steven Milch
Victoria Marquis
Crowley Fleck PLLP
490 N. 31st Street, Suite 500
Billings, Montana 59101-2529
Phone: (406) 252-3441
Fax: (406) 252-5292
Email: smilch@crowleyfleck.com
vmarquis@crowleyfleck.com

Troy A. Glander (Admitted *Pro Hac Vice)*
ALLAN, NAVA, GLANDER & HOLLAND, PLLC
13409 NW Military Hwy, Suite 300
San Antonio, TX 78231
Phone: (210) 305-4220
Fax: (210) 305-4219
Email: TGlander@ANGlawfirm.com

Attorneys for Plaintiff

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MONTANA
BUTTE DIVISION

AT&T CORPORATION, Plaintiff, vs. JACKSON UTILITIES, LLC, Defendant.	Case No. CV-15-39-BU-BMM-JCL **AT&T CORPORATION'S EXPERT WITNESS DISCLOSURE**

AT&T Corporation ("AT&T"), submits its Expert Witness Disclosure pursuant to Fed.R.Civ.P. 26(a)(2) and in accordance with the court's Scheduling

Order. AT&T may call the following expert witnesses to give testimony on the following issues and subjects:

Rule 26(a)(2)(B) RETAINED EXPERTS

1. Gerry J. Harvey
3227 Stonesthrow Drive
Newton, NC 28658
(828) 320-6243

Mr. Harvey is a fiber optics field engineer. He has experience in designing, constructing and repairing long haul fiber optic systems. Mr. Harvey will provide testimony regarding AT&T's long haul fiber optic cable that was damaged by Jackson Utilities on August 1, 2013 and the repairs and costs involved in restoring AT&T's cable services. Specifically, Mr. Harvey will testify that the repair actions and resulting costs incurred by AT&T for the emergency restoration were reasonable and necessary to promptly restore a level of optical continuity. The actions and costs for the make-ready and protection work were reasonable and necessary to prepare for the final repair. He will also testify that the repair actions and costs for the permanent repair with one additional field splice to more fully restore the operational capability of the AT&T system were reasonable and necessary. Mr. Harvey will further testify that to restore AT&T to the position it was in before the damage occurred it was reasonable and necessary to replace the roughly 30,000 foot cable that was cut and he will testify as to the reasonable and necessary costs associated with the same.

Mr. Harvey's opinions are more fully set forth in his signed written report, which is attached as Exhibit 1. The report contains a complete statement of all opinions to be expressed, the basis and reasons for those opinions, and the data or other information considered by Mr. Harvey. A CV, list of testimony, and fee schedule are also attached to Exhibit 1.

Mr. Harvey's disclosure is based on the information presently available. Discovery in this matter is ongoing. Additional depositions and/or written discovery are anticipated. Mr. Harvey reserves the right to supplement and/or revise his findings, opinions, or conclusions if further information and/or documents are identified in the course of discovery, as well as his review of any additional depositions that may be taken. It is possible that, as discovery progresses and trial approaches, Mr. Harvey may formulate exhibits to summarize or support his findings, opinions, or conclusions, including potential photographs, diagrams, drawings, or working models. In the event that Mr. Harvey's findings, opinions, or conclusions are revised based on subsequent information, or additional exhibits are developed, a supplemental disclosure will be made.

Rule 26(a)(2)(C) NON-RETAINED EXPERTS

1. Shane Linse
   Fiberline, Inc.
   3211 Hesper Road
   Billings, MT 59102
   (406) 656-5030

Mr. Linse is the owner of Fiberline, Inc. Fiberline, Inc. is the third party vendor hired by AT&T to restore service to AT&T's network after AT&T's underground facility was damaged by Jackson Utilities ("JU") while excavating using a vibratory plow on August 1, 2013, just north of Churchill Road, between Highline and Anderson, Gallatin County, Montana (the "Damage Location"). Mr. Linse is expected to testify about his opinions regarding the cause of the damage, and specifically, whether JU:

a. properly notified, through the one call notification center, all owners of underground facilities in the area of the proposed excavation,

b. properly determined if weather, time, or other factors may have affected locate marks,

c. properly determined, as a result of the weather, time or other factors, a relocation of underground facilities was warranted,

d. should have been excavating considering that all known facilities had to be located and marked prior to beginning excavation,

e. properly maintained the locate markings at the Damage Location,

f. should have excavated considering that an excavator cannot excavate if said excavator discovers that an underground facility has not been located and marked within the scope of a valid one call ticket, and

g. acted in a careful and prudent and/or negligent manner in the operation of the mechanized equipment when Jackson Utilities damaged AT&T's underground facilities.

Mr. Linse arrived at the Damage Location on August 2, 2013 to assist AT&T with the temporary repair. Mr. Linse's opinions will be based on his recollection of the Damage Location when he arrived on August 2, 2013, as well as deposition testimony of AT&T's Mark Alan Malin; deposition testimony of JU's Aaron Notarius, Sven Kjelsrud, and Dayton Jackson; pictures taken by AT&T, Pauley Construction, KLJ Solutions, JU, and ELM Locating and Utility Services; and Aaron Notarius' statement, which has been produced in this lawsuit. Mr. Linse's opinions are also based upon his knowledge of industry standards and practices, as well as his education, training, and work experience.

It is anticipated that Mr. Linse will testify that:

a. JU did not properly notify owners of the underground facilities that JU would be excavating in the Damage Location on or about August 1, 2013,

b. AT&T did have locate marks at the Damage Location, but some of those marks had been degraded to various degrees as a result of a variety of factors, including JU's failure to maintain the locate marks, and

c. even if the ticket JU called in on July 17, 2013 can be construed to cover the Damage Location, JU should have called in another ticket and requested that the locate marks be refreshed considering that:

i. Century Link's locate marks were not continuous throughout the Damage Location (they just stopped as they veered away from the fence toward the telephone pole),

ii. AT&T either had flags indicating that they had a facility crossing the dirt path or they had flags that seemed to stop along the fence, and

iii. given both of the above, JU was aware of utilities located within the Damage Location that either had not been located and marked by the owners or appeared to be in conflict with the path of excavation.

In summary, Mr. Linse will testify that JU was negligent, and did not act as a reasonable and prudent excavator when JU began excavating through the Damage Location on August 1, 2013.

2. Mark Alan Malin
611 4th Avenue West
Three Forks, MT 59752
(406) 539-1024

Mr. Malin is a utility locator for AT&T. He is listed as a non-retained expert based on his knowledge of the locating services industry standards and practices and will testify in accordance with his deposition. Mr. Malin's opinions are based

upon his knowledge of industry standards and practices, AT&T's policies and procedures, as well as his education, training, and work experience.

3. Kenneth Kiefer
230 7th Avenue East
Wendell, ID 83355
(208) 280-8653

Mr. Kiefer was the Engineer Tech 2 construction observer for KLJ Engineering. He is listed as a non-retained expert based on his knowledge of the excavation project and applicable industry standards and practices, and will testify in accordance with his deposition. Mr. Kiefer's opinions are based upon his knowledge of industry standards and practices, as well as his education, training, and work experience.

4. Bert Tuttle
Montrose, CO
(602) 568-0156

Mr. Tuttle was the project foreman for Pauley Construction. He is listed as a non-retained expert based on his knowledge of construction industry standards and practices and will testify in accordance with his deposition. Mr. Tuttle's opinions are based upon his knowledge of industry standards and practices, as well as his education, training, and work experience.

5. Lynn Lavinder
204 7th Street
Belgrade, MT 59714
(406) 579-9402

Ms. Lavinder is a utilities locator for ELM Locating and Utility Services. She is listed as a non-retained expert based on her knowledge of locating services industry standards and practices and will testify in accordance with her deposition. Ms. Lavinder's opinions are based upon her knowledge of industry standards and practices, as well as her education, training, and work experience.

6. Any non-objectionable expert identified by Jackson Utilities.

7. Any expert and/or witness necessary for rebuttal or impeachment, or as becomes necessary during the course of discovery. AT&T reserves the right to present rebuttal expert testimony as required.

8. Any expert and/or witness necessary for foundation or authentication.

DATED this 6th day of May, 2016.

CROWLEY FLECK PLLP

By______________________

Steven R. Milch
P.O. Box 2529
Billings, MT 59103-2529

Attorneys for Plaintiff AT&T Corporation

CERTIFICATE OF SERVICE

I hereby certify that the foregoing document was served upon the following counsel of record, by the means designated below, this 6th day of May, 2016:

[x] U.S. Mail [ ] FedEx [ ] Hand-Delivery [ ] Facsimile [x] Email [ ] ECF Electronic filing	Patrick M. Sullivan, Esq. POORE, ROTH & ROBINSON, P.C. 1341 Harrison Avenue Butte, MT 59701
[x] U.S. Mail [ ] FedEx [ ] Hand-Delivery [ ] Facsimile [x] Email [ ] ECF Electronic filing	Quentin M. Rhoades Nicole L. Siefert RHOADES & SIEFERT, P.L.L.C. 430 North Ryman, Second Floor Missoula, MT 59802

STEVEN R. MILCH

EXHIBIT
1

Investigation of Fiber Optic Cable Damage
AT&T Billings, MT to Spokane, WA Route

August 1, 2013

AT&T Corporation
vs.
Jackson Utilities, LLC

Case No.: ATAT-MT-201308-01-0001-KMG

Submitted to
Steve Nava
Allan, Nava, Glander & Holland, PLLC
13409 NW Military Hwy, Suite 300
San Antonio, TX 78216

May 3, 2016

Prepared by

Gerry J Harvey
Gerry J Harvey
3227 Stonesthrow Dr
Newton, NC 28658
828 320 6243
gjharvey@charter.net

The following represents my report in the matter of AT&T Corporation vs. Jackson Utilities, LLC. It is based on review of materials submitted to me by AT&T, conversations with AT&T and AT&T contractor, my education and experience as a fiber optics field engineer and my experience designing, constructing and repairing long haul fiber optic systems. I reserve the right to amend this report if other material evidence becomes available.

Summary of Incident:

On August 1, 2013, an AT&T long haul 192-fiber optic cable that was installed in an underground 36.93 mile route from Three Forks, MT to Bozeman, MT was damaged at a location south of Highline Rd off Churchill Rd in Gallatin County, MT that resulted in a loss of signal (AT&T/JU-00318). A vibratory plow operated by Jackson Utilities impacted AT&T's duct bank, one of which contained the long haul cable. An emergency restoration was performed and telecommunication services were restored to some of the fiber paths by Big Sky Construction (Fiberline, Inc.) and AT&T rolling traffic over to acceptable fiber spares (AT&T/JU-00318).

There were a total of three repair actions performed to remedy the cable damage and thereby more fully restore the AT&T system. The first repair action was an emergency restoration effort that involved AT&T and Fiberline troubleshooting the damage area near marker 1472 (AT&T/JU-00348) and restoring the system as mentioned above. The second repair action involved some make-ready and protection work by the installation contractor in preparation for the final and permanent repair. The third repair action was the permanent repair and involved replacing the damaged cable from an original splice point to the south, 218S (AT&T/JU-00344) and an intermediate pull handhole to the west, 220L (AT&T/JU-00350) which was then converted to a splice vault.

Professional Opinions and Basis for these Opinions:

In my professional opinion the repair actions and resulting costs incurred by AT&T for the emergency restoration were reasonable and necessary to promptly restore a level of optical continuity. Also, the required actions and the resulting costs for the make-ready and protection work were reasonable and necessary to prepare for the final repair and lastly, the repair actions and costs for the permanent repair with one additional field splice to more fully restore the operational capability of the AT&T system were reasonable and necessary.

More specifically:

1. Background of original fiber optic cable system build: the original AT&T underground 192-fiber optic cable that connected Three Forks, MT to Bozeman, MT was constructed in February 2005 and is part of the Billings to Seattle link (AT&T/JU-00001). The construction drawings describe the affected cable section between splice points 218S (AT&T/JU-00344) to splice point 225S (AT&T/JU-00524) for a total of 30,208 feet.

2. Emergency Repair:

A. On August 1, 2013, AT&T was able to localize the damage to an area just north of Anderson Rd and Churchill Rd intersection in Gallatin County, MT. A contractor using a vibratory plow to install another fiber optic cable and conduit impacted and damaged a splice handhole, 218S (AT&T_KLJ00107) and an AT&T four by 1.5 inch duct bank, one of which housed a 192-fiber optic cable for long haul communications (AT&T/JU-00307). AT&T's OSP, outside plant, was damaged to the extent that all four conduits were severely kinked and the 192-fiber optic cable's minimum bend radius was violated and optical fibers were broken (AT&T/ JU-00164). For the emergency repair, an installation contractor, Fiberline was able to straighten out the duct containing the cable and sufficiently relieve the attenuation to restore optical continuity and clear the alarms. The fiber paths, OC-48s and OC-192s (optical line speeds) were initially restored with AT&T technicians physically travelling to the optical amplifier sites at Three Forks and Bozeman and re-routing optical fiber jumpers to spare fibers in the 192-fiber optic cable that had some level of continuity (AT&T/JU-00318).

B. AT&T captured labor expenses (AT&T/JU-00011) that totaled **$1,609.37** for work performed on August 1, 2013 which only covered the time for three AT&T technicians for the immediate part of the process of restoring network operations. More resources were expended including four AT&T personnel (Critique Call Attendees) at CNMC, Cable Network Management Center who monitored the emergency repair actions and made fiber path corrections in AT&T's software systems (AT&T/JU-00316). That additional labor cost totaled at least **$1,600.00**. The total reasonable and necessary charges for AT&T's labor would be at least $1,609.37 + $1,600.00 = **$3,209.37**

C. The installation contractor, Fiberline charged **$12,960.00** for their time and equipment on August 2, 2013 to effect the emergency restoration which was reasonable and necessary and in line with industry standards (AT&T/JU-00013) and (AT&T/JU-00014). This work involved a series of activities to restore the system in a stable, temporary fashion. The installation contractor was able to carefully back up the cable plow in such a manner as to salvage the cable path and coordinate with AT&T to find enough fiber paths to restore the system. Of note, on the emergency restoration, the installation contractor did not charge AT&T any overtime labor or mobilization fees.

D. There were no charges captured for any of the engineering work required, either from AT&T or one of their approved contractors as this was included in the Critique Call Attendees noted above.

3. Temporary Repair:

A. Fiberline charged **$132,976.00** (AT&T/JU-00013 and (AT&T/JU-00014) for the temporary repair. The damage was located just south of marker 1472 (AT&T/JU-00348) which was between pull vaults 220L, marker 1476 (AT&T/JU-00350) and pull vault 219L, marker 1469 (AT&T/JU-00347). AT&T accepted an additional field splice in this ~ 37 mile fiber optic cable route. For the repair; two locations were chosen that minimized the repair length between an existing splice vault, 218S and converting a pull vault, 220L to a splice vault. The duration of the work took place over six days and involved six major evolutions: 1) accessing the damaged locations with heavy equipment, 2) shoring and providing steel plates over the kinked conduits – one of which contained the operational fiber optic cable, 3) replacing a fiber vault that was damaged at Splice Vault 218S, 4) repairing the conduits by cutting out the damaged portions and coupling in new 1.5 inch conduit sections, 5) proofing the three spare 1.5 inch conduits by using high pressure compressed air and blowing in a compressible sponge dart through the pathway from the entrance and exit point of the duct pathways and 6) installing a new 8,936 feet of 192-fiber optic cable into one of the spare ducts. The time and amount of personnel in the repair team: two fiber splicers, two fiber technicians, two equipment operators and one experienced laborer were reasonable and necessary for the work that was performed. In performing the "on the reel" attenuation test of the 192 fiber with an OTDR, a more efficient method of using mechanical splices versus mechanical connectors would have lowered the cost to $5.00/ fiber versus $20.00/ fiber thereby reducing the $3,840.00 charge by $2,880.00. Only one duct was invoiced for the "proofing" evolution - there was no charge for "proofing" the other two spare ducts after the repair and this would be a reasonable charge. Thus, two x 8,936 feet of duct at $1.00/ft. would add $17,872.00. The material costs and amounts for the temporary repair were reasonable and necessary with the miscellaneous material covering replacement duct and duct couplings. The equipment charges were reasonable and necessary. Local authorities required traffic control for public safety during the repair work so this is a reasonable line item charge. After the adjustments, the total reasonable and necessary costs for the installation contractor are at least $132,976.00 - $2,880.00 + $17,872.00 = **$147,968.00**.

B. There were no charges captured for any of the engineering work required, either from AT&T or one of their approved contractors. The reasonable and necessary charges would be at least **$1,000.00**.

4. Permanent Repair

A. For the permanent repair, a series of activities were required to restore the system to its reconfigured build condition. The emergency and temporary repairs above were performed to expeditiously restore the optical signal and prepare the Outside Plant for the permanent repair. Since the duct and fiber optic cable were crushed and optical fibers were broken, it was necessary to replace this section at a minimum to ensure long-term reliability of the Outside Plant. Thus, AT&T contracted Fiberline to make the permanent repair.

B. AT&T labor charges invoiced for the permanent repair were **$2,869.24** which only covered the services for the four Outside Plant technicians rolling traffic to support the PCI, Planned Cable Intrusion for the permanent repair (AT&T/JU-00011). The PCI is a coordinated process whereby the new section of fiber optic cable is cut into the existing cable, fusion spliced into spare fibers of the existing cable and then operational traffic is rolled onto these spare fibers by technicians in the Bozeman and Three Forks OA, Optical Amplifier, sites. This process is continued until all of the fibers are transitioned between the new fiber optic cable and the previously existing damaged cable. The work performed by AT&T and the costs associated with same were reasonable and necessary.

C. Fiberline, the installation contractor charged a total of **$62,730.00** to effect the permanent repairs which covered 1) the make-ready work in uncovering two handholes for building splice cases and completing mid-span fusion splices for the PCI, 2) uncovering the damaged location and removing the steel plates, 3) removing the damaged fiber optic cable, 4) repairing the damaged duct and 5) proofing this repaired fourth duct between the new field splice points (AT&T/JU-00015) and (AT&T/JU-00016). The loaded labor rates listed for the permanent repair described are reasonable and necessary and in-line with industry standards and the work was necessary to complete this portion of the project. A more reasonable time to effect the permanent repair would be one month versus the two months, thus the steel plate rentals should be lowered to one month versus two months and reduced by $6,000. Traffic control was also provided and was necessary and reasonable for public safety. Fiberline did not charge for the cost to remove the damaged 192-fiber optic cable or proof the repaired fourth duct section between the two new splice points. A reasonable charge for these tasks would be 8,936 feet x $2.00/ft. for $17,872.00. Fiberline did not charge for any overtime labor charges or mobilization fees. After the adjustments, the total reasonable and necessary costs for the installation contractor should be $62,730.00 - $6,000.00 + $17,872.00 = **$74,602.00**.

D. There were no charges captured for any of the engineering work required, either from AT&T or one of their approved contractors. The reasonable and necessary charges would be at least **$2,000.00**.

E. The 10,100 feet of 192-fiber optic replacement cable ordered cost **$31,405.00** (AT&T/JU-00018). It is reasonable to order 10% more than the ground footage to ensure sufficient length and adequate slack storage. The cost of the replacement 192-fiber optic cable is reasonable and necessary.

F. I am not making comment on the Loss of Use charge of $6,529.36 or the SDR FCC Reportable charge of $2,200.37 (AT&T/JU-00011).

G. AT&T chose the above repair as a permanent solution. This repair included adding one additional field splice point by converting a pull handhole, 220L to a splice handhole. In order to restore AT&T's original engineered span prior to the damage, AT&T would have to have installed a replacement fiber optic cable section between the two existing splice vaults of 218S and 225S which total a distance of 30,208 feet. This splice to splice repair would ensure that AT&T's outside plant was restored to a position before the damage occurred and would eliminate the potential failure point of the added splice closure and would ensure that no additional attenuation was injected into the system. This splice to splice restoration is the reasonable and necessary repair to restore the system prior to the damage. The estimated additional reasonable and necessary cost for the splice to splice restoration would be at least **$101,545.40** which would break down as follows: the additional length of 20,108 feet of 192-fiber optic cable would have added $61,329.40 and the fiber optic cable removal and placing costs would have added 20,108 feet x ($1.00/ ft. for removal and $1.00/ft. for placing) for $40,216.00; thus the reasonable and necessary total for the permanent splice to splice repair would be at least **$377,559.01.**

4. The Breakdown of Charges, (AT&T/JU-00011) describes AT&T labor charges, the installation contractor, Fiberline charges for labor and equipment and the material charge, TTL Supply for the replacement 192-fiber optic cable. The total charges submitted were **$253,279.34**. Based on all of the information above, it is my opinion that the reasonable and necessary costs for the emergency, temporary and permanent repairs total at least **$276,013.61**.

This breaks out as follows:

AT&T's labor for the emergency repair: **$1,609.37**

AT&T's labor for the emergency repair (unbilled): **$1,600.00**

AT&T's labor for the permanent repair: **$2,869.24**

AT&T's Material Cost for Fiber Optic Cable, TTL Supply: **$31,405.00**

Installation Contractor Charges:

Installation Contractor labor, Fiberline for emergency repair: **$12,960.00**

Installation Contractor labor, Fiberline for temporary repair: **$132,976.00**

Installation Contractor labor, Fiberline for temporary repair (adjustments): **$14,992.00**

Installation Contractor, Fiberline for permanent repair: **$62,730.00**

Installation Contractor, Fiberline for permanent repair (adjustments): **$11,872.00**

Engineering Contractor Charges:

Engineering charges for temporary repair (unbilled): **$1,000.00**

Engineering charges for permanent repair (unbilled): **$2,000.00**

5. A summary of charges are listed within Exhibit A, Exhibit B and Exhibit C

Information considered in formulating the above opinions:

1. Shared files from AT&T: (AT&T/JU-00001 to AT&T/JU-00339 and AT&T/JU-00344 to AT&T/JU-00351, AT&T/JU-00524) and (SDT_KLJ00001 to SDT_KLJ00110)
2. Teleconference with AT&T personnel
3. Teleconference with AT&T Contractor
4. National Construction rates for OSP fiber optic construction from Corning Optical Communications

Attachments:
Attached and made a part of this report are the summary of charges (Exhibit A, Exhibit B and Exhibit C), my Curriculum Vitae (Exhibit D), an article published in the telecommunications industry (Exhibit E) and a list of cases I have provided testimony in the past four years (Exhibit F).

Compensation:
My fee schedule is $225.00 per hour plus expenses at cost.

EXHIBIT

A

Investigation of Fiber Optic Cable Damage
AT&T Bozeman, MT to Three Forks, MT Route
August 1, 2013

AT&T Corp.
vs.
Jackson Utilities
Case No.: ATAT-MT-201308-01-0001-KMG

	REPAIR			
	EMERGENCY	TEMPORARY	PERMANENT	TOTAL
AT&T Labor (billed)	$ 1,609.37		$ 2,869.24	$ 4,478.61
AT&T Labor (unbilled)	$ 1,600.00			$ 1,600.00
AT&T Material			$ 31,405.00	$ 31,405.00
Installation Contractor (billed)	$ 12,960.00	$ 132,976.00	$ 62,730.00	$ 208,666.00
Installation Contractor (adjustments)		$ 14,992.00	$ 11,872.00	$ 26,864.00
Engineering Costs (unbilled)	$ -	$ 1,000.00	$ 2,000.00	$ 3,000.00
	$ 16,169.37	$ 148,968.00	$ 110,876.24	$ 276,013.61

Exhibit A

EXHIBIT

B

Detailed Breakdown of Charges

Type of Repair	Category of Expense	Details	Source Doc	Comment	Amount Invoiced	Repair with Additional Splice - Reasonable & Necessary Amount	Repair with Additional Splice - Reasonable & Necessary Section Totals	Repair with Additional Splice - Reasonable & Necessary Repair Totals
Emergency Repair	AT&T Labor	Labor captured and included in Breakdown for Damages	AT&T/JU-00011	No Change	$ 1,609.37	$ 1,609.37	$ 3,209.37	$ 16,169.37
Emergency Repair	AT&T Labor	Unbilled	G. Harvey Report	Additional AT&T labor charges for Critiques Call Personnel	$ -	$ 1,600.00		
Emergency Repair	Installation Contractor	Invoiced by Fiberline, Inc.	AT&T/JU-00013 AT&T/JU-00014	No change	$ 12,960.00	$ 12,960.00	$ 12,960.00	
Temporary Repair	Engineering Costs	Unbilled	G. Harvey Report	Typical Engineering Costs	$ -	$ 1,000.00	$ 1,000.00	$ 148,968.00
Temporary Repair	Installation Contractor	Invoiced by Fiberline, Inc.	AT&T/JU-00013 AT&T/JU-00014	Charges as Invoiced	$ 132,976.00	$ 132,976.00	$ 147,968.00	
Temporary Repair	Installation Contractor	Reduction in Invoice	G. Harvey Report	reduce cost for "on the reel" testing	$ -	-$ 2,880.00		
Temporary Repair	Installation Contractor	Unbilled	G. Harvey Report	added proofing the two spare ducts each for 8,936 ft	$ -	$ 17,872.00		
Permanent Repair	AT&T Labor	Labor captured and included in Breakdown for Damages	AT&T/JU-00011	No Change	$ 2,869.24	$ 2,869.24	$ 2,869.24	$ 110,876.24
Permanent Repair	AT&T Material	10,100' 192-fiber optic cable	AT&T/JU-00018	No Change	$ 31,405.00	$ 31,405.00	$ 31,405.00	
Permanent Repair	Engineering Costs	Unbilled	G. Harvey Report	Typical Engineering Costs	$ -	$ 2,000.00	$ 2,000.00	
Permanent Repair	Installation Contractor	Invoiced by Fiberline, Inc.	AT&T/JU-00015 AT&T/JU-00016	Charges as Invoiced	$ 62,730.00	$ 62,730.00	$ 74,602.00	
Permanent Repair	Installation Contractor	Unbilled	G. Harvey Report	add the cost of removal of 8,936 ft of damaged cable	$ -	$ 8,936.00		
Permanent Repair	Installation Contractor	Unbilled	G. Harvey Report	add cost of proofing the 8,936 ft of repaired duct	$ -	$ 8,936.00		
Permanent Repair	Installation Contractor	Reduction in Invoice	G. Harvey Report	reduce rental cost of steel plates from two months to one	$ -	-$ 6,000.00		
				TOTALS	$ 244,549.61	$ 276,013.61	$ 276,013.61	$ 276,013.61

Loss of Use	OC192 Circuit Trunk and Toll	AT&T/JU-00011	No opinion given	$ 6,529.36	$ 6,529.36	$ 6,529.36	$ 6,529.36
Material	SDR FCC Reportable	AT&T/JU-00011	No opinion given	$ 2,200.37	$ 2,200.37	$ 2,200.37	$ 2,200.37
			TOTALS	$ 253,279.34	$ 284,743.34	$ 284,743.34	$ 284,743.34

Exhibit B

EXHIBIT

C

Detailed Breakdown of Charges

Type of Repair	Category of Expense	Details	Source Doc	Comment	Amount Invoiced	Full Splice to Splice Repair - Reasonable and Necessary Costs	Full Splice to Splice Repair - Reasonable and Necessary Costs Section Totals	Full Splice to Splice Repair - Reasonable and Necessary Costs Repair Totals
Emergency Repair	AT&T Labor	Labor captured and included in Breakdown for Damages	AT&T/JU-00011	No change	$ 1,609.37	$ 1,609.37	$ 3,209.37	$ 16,169.37
Emergency Repair	AT&T Labor	Unbilled	G. Harvey Report	Additional AT&T labor charges for Critiques Call Personnel	$ -	$ 1,600.00		
Emergency Repair	Installation Contractor	Invoiced by Fiberline, Inc.	AT&T/JU-00013 AT&T/JU-00014	No change	$ 12,960.00	$ 12,960.00	$ 12,960.00	
Temporary Repair	Engineering Costs	Unbilled	G. Harvey Report	Typical Engineering Costs	$ -	$ 1,000.00	$ 1,000.00	$ 148,968.00
Temporary Repair	Installation Contractor	Invoiced by Fiberline, Inc.	AT&T/JU-00013 AT&T/JU-00014	Charges as Invoiced	$ 132,976.00	$ 132,976.00	$ 147,968.00	
Temporary Repair	Installation Contractor	Reduction in Invoice	G. Harvey Report	reduce cost for "on the reel" testing	$ -	-$ 2,880.00		
Temporary Repair	Installation Contractor	Unbilled	G. Harvey Report	added proofing the two spare ducts each for 8,936 ft	$ -	$ 17,872.00		
Permanent Repair	AT&T Labor	Labor captured and included in Breakdown for Damages	AT&T/JU-00011	No change	$ 2,869.24	$ 2,869.24	$ 2,869.24	$ 212,421.64
Permanent Repair	AT&T Material	10,100' 192-fiber optic cable	AT&T/JU-00018	No change	$ 31,405.00	$ 31,405.00	$ 92,734.40	
Permanent Repair	AT&T Material	30,208 feet of 192-fiber optic cable	AT&T/JU-00018	Full cable length to restore span from splice to splice	$ -	$ 61,329.40		
Permanent Repair	Engineering Costs	Unbilled	G. Harvey Report	Typical Engineering Costs	$ -	$ 2,000.00	$ 2,000.00	
Permanent Repair	Installation Contractor	Invoiced by Fiberline, Inc.	AT&T/JU-00015 AT&T/JU-00016	Cost charged by Fiberline	$ 62,730.00	$ 62,730.00	$ 114,818.00	
Permanent Repair	Installation Contractor	Invoiced by Fiberline, Inc.	AT&T/JU-00015 AT&T/JU-00016	lower rental of steel plates from two months to one	$ -	-$ 6,000.00		
Permanent Repair	Installation Contractor	Invoiced by Fiberline, Inc.	G. Harvey Report	add cost to remove 8,936 ft damaged cable	$ -	$ 8,936.00		
Permanent Repair	Installation Contractor	Invoiced by Fiberline, Inc.	G. Harvey Report	add proofing of 8,936 ft of repaired duct	$ -	$ 8,936.00		
Permanent Repair	Installation Contractor	Invoiced by Fiberline, Inc.	G. Harvey Report	additional 20,108 ft of cable to be removed	$ -	$ 20,108.00		
Permanent Repair	Installation Contractor	Invoiced by Fiberline, Inc.	G. Harvey Report	remove additional 20,108 ft of cable	$ -	$ 20,108.00		
				TOTALS	$ 244,549.61	$ 377,559.01	$ 377,559.01	$ 377,559.01
	Loss of Use	OC192 Circuit Trunk and Toll	AT&T/JU-00011	No opinion given	$ 6,529.36	$ 6,529.36	$ 6,529.36	$ 6,529.36
	Material	SDR FCC Reportable	AT&T/JU-00011	No opinion given	$ 2,200.37	$ 2,200.37	$ 2,200.37	$ 2,200.37
				TOTALS	$ 253,279.34	$ 386,288.74	$ 386,288.74	$ 386,288.74

Exhibit C

EXHIBIT

D

GERRY J. HARVEY
3227 Stonesthrow Dr.
Newton, NC 28658-8701
(828) 320-6243 (mobile)
gjharvey@charter.net

OBJECTIVE:

To provide consulting services that require expertise in the installation and service of fiber optic systems.

EDUCATION:

Francis Marion College Florence, SC	B. A. Chemistry & Math, 1979 3.3 GPA

EXPERIENCE:

05/2013 to present Fiber optic engineering consulting services

01/2011 to 05/2013 Director, Global OSP Engineering and Construction, Corning Optical Communications

Led Global efforts of fiber to the home projects in Germany, Canada, India Brazil and China. Utilized Applications Engineering group and Pioneers to innovate installation methods and products for lower cost, highest quality and speed to market for customer solutions in telecommunications and data communication industry.

11/2003 to 01/2011 Sr. Projects Manager, Corning Cable Systems

Led field support efforts for a major US Telecom Service provider in their fiber to the home initiatives. Ensured the successful deployment of tip-to-tip cable and hardware solutions from the central office to the subscriber's home. Instrumental in developing continuous improvement by lowering deployed costs and assuring quality installations. Contributed to the ability to provide factory engineered cable systems to expedite deployment velocity. Developed novel methods for installation of inside plant cables to the customer premise. Supported Australia's initiatives in factory engineered systems.

03/2001 to 11/2003 Manager, Project Services Support, Corning Cable Systems

As a member of an international project team, developed deployment methods and installation methods for dispersion managed cable systems. Emphasis on accurate length measurements, splicing and test processes to ensure successful installation. Constructed first 100km test bed and proved in system capabilities.

12/1995 to 03/2001 Quality Manager, Specialty Cable Plant, Siecor

Managed the plant's quality and training efforts in the production of fiber optic flame retardant cable and connectorized cable assemblies. Completed a series of ISO surveillance audits including first triennial audit with zero nonconformances. Led Specialty Cable Plant to Bellcore's CSQP^{SM} registration.

04/1989 to 12/1995 Field Engineering Manager, Siecor

Led a group of 40 engineers and technicians in the support of Siecor's cable, hardware and equipment. Primary responsibilities included project work that encompassed the installation of cable, splicing of optical fibers, connectorization and final test and documentation for telco, premise and CATV systems. Completed project work in US, Japan and led the first fiber optic continental build for India. Developed and taught a series of fiber optic training courses. Implemented a Duty Engineer line to provide phone support and field support to customers with technical questions on Siecor products.

04/1985 to 04/1989 Field Engineer/ Sr. Field Engineer/ Projects Supervisor, Siecor

Completed training on technical use of Siecor's optical cable, hardware and equipment. Extensive travel and customer support. Conducted fiber optic training to Taiwan Department of Telecommunications. Performed first field fiber dispersion test at Idaho National Engineering Labs. Installed video surveillance security system at Falcon Air Force Station, Colorado.

1979 - 1985 United States Navy, Lieutenant, Submarine Officer

Completed nuclear engineering training program and held several positions to include: electrical officer, assistant operations officer and damage control assistant officer on nuclear powered missile and fast attack submarines.

AWARDS: Civilian, Patents:

Patent No.	Title
8,565,565	Optical fiber assemblies
8,515,236	Fiber optic drop cable assembly for deployment on building walls
8,155,490	Fiber optic cable furcation assemblies and methods
7,874,411	Reel for maintaining fiber optic cable assemblies
7,572,066	Translucent dust cap for fiber optic adapter
5,133,583	Method for use of mesh type cable pulling grips

EXHIBIT

E

Published on *OSP Magazine* (http://www.ospmag.com)

Home > Avoiding a Costly Crush

Avoiding a Costly Crush

Avoiding a Costly Crush

Four Fundamentals of Safe Fiber Optic Cable Placement
by: Matt Fitzgerald and Gerry Harvey
OSP Magazine

Driven by the American Recovery and Reinvestment Act of 2009 (ARRA) and Broadband Stimulus, the demand for outside plant cable is likely to surge in 2011 to 2012. With more and more miles of cable being deployed under the constraints of tight deadlines, installers will be under increased pressure to place cable quickly but safely. Meanwhile, with many Americans still out of work, this surge of demand in the cable installation space is likely to draw less experienced or even untrained installers into the fiber optic cable installation business. All of these factors add up to one message. Now is the right time for contractors, consultants, engineering firms and end users to evaluate and refresh their understanding of safe fiber optic cable placement fundamentals.

Four Steps to Live By

Step 1: Choose an experienced, reputable supplier.

A successful fiber optic cable installation begins long before the cable is even delivered by selecting a reputable fiber optic cable supplier and installation team. An established, experienced, high-quality supplier can provide specific fiber optic cable installation guidelines that enable the installation to go much smoother.

These manufacturers have conducted environmental and mechanical tests specifically designed to ensure the cable will survive both the rigors of installation and a lifetime of exposure to the elements common in the outside plant environment. Each cable design must successfully complete these tests as part of the internal design and qualification process.

The goal of construction is to maintain the integrity of the cable, protecting the underlying optical fiber. Guidelines provided by the supplier or relevant industry standards will ensure that this is accomplished. Cable suppliers may also be able to provide a list of preferred or certified installers, helping to eliminate the risks associated with using an untrained crew.

Step 2: Inspect the cable and reel.

Once the vendor is selected and the cable is procured, the next step to ensure a successful cable installation is proper receipt and handling of the cable reel. Every optical fiber in each reel should be tested from the factory, and the attenuation recorded on a cable data sheet that is shipped with the reel or otherwise made available by the supplier.

Before beginning the installation, make sure all fibers have been tested and conform to the specified performance requirements. It may be a good idea to test each fiber on the reel with an Optical Time Domain Reflectometer (OTDR) before beginning cable placement. In some cases, this may be a warranty requirement, so save any OTDR traces that indicate abnormalities or yield unexpected results.

Check general reel integrity for signs of excessive weathering or damage. The thermal wrap should stay in place until cable placement. For wooden reels, ensure the hub bolts are tightened, and verify all nails, bolts or screws on the inside surface of the flanges are fully clenched or counter-sunk to avoid damage to the cable during payoff.

Make sure the cable has a good traverse, free of crossovers, loops or excessive slack. Verify the print statement is correct and legible. In some cases, bulk reels are direct-shipped with a colored vinyl cap on the end of the cable to provide guidance for tensile capability and minimum bend diameter. (See Figure 1.)

Figure 1: End cap color guidelines.

Step 3: Choose the proper installation hardware.

There is a lot of hardware that looks like it might be useful for cable installation but is not designed for fiber optic cables. Fiber cables have design limits, especially around tension and bend. Small sheaves and wheels designed for power cables, for example, may seem like convenient tools to redirect the cable while entering or exiting handholes, pedestals and vaults. However, these small wheels may cause the fiber optic cable to experience bend conditions that are just too tight for the design. This can cause excessive crushing forces inside the cable, resulting in splintering of the central strength member, crushed buffer tubes and, ultimately, broken fibers. These small wheels can cause cable damage even at relatively low tensions.

Furthermore, the cable can be damaged, even at angles less than 90 degrees. If the tension is high enough to cause the cable to conform to a portion of the radius of the wheel, even for a short time, the entire cable passing over the wheel will experience a bend that is below the cable's rating, and damage is likely to occur. This damage may be contained entirely within the cable, with little or no indication on the outer jacket. (See Figures 2 and 3.)

Avoid These Mistakes (Figures 2 - 4)

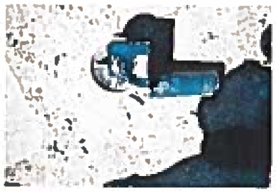

Figure 2: The wheel on this cable feeding sheave, designed for installation of power cable, has a diameter of less than one inch, far below the minimum bend diameter of typical outside plant cables.

Figure 3: Lip roller designed for power cable.

Figure 4: Cable vault entry or exit at severe angles.

Similar to the cable feeding sheave in Figure 2, the lip roller shown in Figure 3 is designed for power cable. These devices are typically rated for 10,000 lbf or greater and are comprised of small rollers. While the lip roller will avoid dragging the cable across a sharp edge, the diameters are insufficient for placing fiber optic cable and will subject the cable to compressive forces under load that will collapse the buffer tubes and break fibers.

Ensure all equipment used for installation is calibrated and well maintained. For cable pulling into ducts, a breakaway swivel is necessary in order to control both the tension and the torsion on the cable. For jetting applications, broken or out-of-calibration gauges on the jetting equipment will fail to detect tension spikes that may damage the cable. Also, ensure the tracks of the jetting equipment firmly engage the cable and are not prone to slipping during installation.

Step 4: Control the cable installation to avoid common mistakes.
This step contains 5 common errors made in many cable placements. Put these on the top of your checklist BEFORE you begin the installation process.

Common Mistake 1: Paying off the cable. It is imperative that the cable is controlled during payoff, span routing and takeup. For the payoff, it is necessary to ensure that the cable feeds off the reel and into the aerial run or duct bank smoothly and with minimal back tension. Some amount of back tension may be desired to prevent the payoff reel from freewheeling. For duct installations, place the cable reel in line with the intended direction of deployment, in order to prevent the cable from rubbing excessively against the reel flange. This will help protect the cable jacket and print statement, and avoid any potential tight bends the cable might otherwise experience from pulling across the edge of the flange.

For aerial installations, the key is positioning corner blocks with sufficient radius to control bend. Small single cable stringing blocks are not appropriate for offset or corner pulls. For the subduct run, it should be racked appropriately and the pull tension calculated so that tension is not exceeded.

Common Mistake 2: Entering and exiting ducts. The condition of the subduct is important to the placing of the cable. Oftentimes, one contractor has placed the subduct, and another is responsible for placing the cable. There are some simple proofing tests if the cable is being jetted that will ensure that the duct is continuous, unobstructed and ready for safe placing. A lubricated foam plug is blown through the subduct and its passage is timed for normal travel. Completing this step will ensure that the pathway is clear and capable of supporting the greatest length of cable placement.

Wherever the cable enters or leaves the duct infrastructure, it is necessary to control the bend radius. This is best accomplished with a wheel or piece of subduct that maintains the proper bend radius. This is where the selection of appropriate hardware will really pay off. Most cable damage occurs at transition points into and out of ducts, due to failure to control cable bend radius, especially at the cable takeup.

When the cable exits the subduct, whether below grade or from the pedestal, it is imperative that the cable not rub against the wall of the subduct at an angle under tension, as this will affect the cable structure. This can occur when the amount of subduct length is too short, and the duct cannot provide the proper cable bend radius control. (See Figure 4.) Whenever possible, it is best to position the pulling equipment in line with the duct. (See Figure 5.)

If the pulling equipment cannot be positioned over the duct and in line, then the safest way to control the pull is to couple a piece of split subduct (~ 3 ft to 6 ft) to the installed base, which maintains the bend radius. (See Figures 6 and 7.)

Acceptable Methods (Figures 5 - 7)

Figure 5: Midspan cable takeup with takeup equipment appropriately placed in line with the duct.

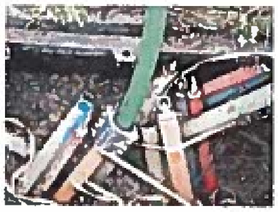

Figure 6: Subduct coupled onto installed duct base. (Figure 6 is an inset of Figure 7.)

Figure 7: Controlling cable bend radius with subduct extension.

To add a bit more description to this minimum bend radius, a bend radius of 15x the cable outer diameter (OD) translates to 30x the cable OD for the diameter of the roller or guide. This is the minimum bend typically specified by many outside plant cable suppliers. Some industry specifications are even more restrictive. For example, the TIA specification ICEA 640, "Standard for Optical Fiber Outside Plant Communications Cable," specifies that 40x the cable OD be maintained during installation. In addition, the location to measure is not the OD of the sheave but to the hub of the guide where the cable rides. (See Figure 8.) Even if the tension is not expected to reach the maximum-rated tension, this is critical to allow for any type of tension excursion that may occur.

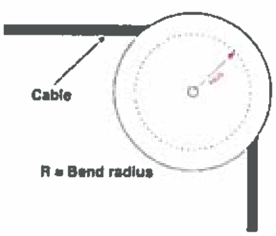

Figure 8: Hub OD must be 30x cable OD.

Common Mistake 3: Handling the cable at midspan points. With the advent of fiber-to-the-home (FTTH), fiber optic cable is being installed and handled with significantly more midspan coiling of slack. If the cable cannot be placed in one continuous run, it will be necessary to bring the cable up, and position the cable for subsequent placing. This cable must be managed in a figure 8 to avoid cable twisting and kinking. After forming the figure 8, the cable is flipped to allow access to the cable end and the smooth payoff of the cable section. This process ensures that the cable is not damaged by twisting during the subsequent installation.

In the formation of the figure 8, it is important to provide sufficient labor force to manage the cable length, ensuring the cable is coiled properly and pays off in smooth form. Also, start the figure 8 some distance away from the reel, and do not force the cable, particularly one that has parallel strength elements and a preferential bend.

Common Mistake 4: Jetting cable. Cable jetting is an efficient way to place long lengths of cable in subduct. Each manufacturer has specific instructions that are important to follow. Of specific note is the increase in 2-inch subducts, particularly in rural FTTx deployments and for traffic control. A simple crash test should be performed to ensure that the cable pusher does not exert too much force on the cable which could cause the cable to fold over or staple within the duct structure.

The greatest stapling risk is with smaller, all-dielectric cables that have a < 0.5-inch OD, but it can occur even with armored cables. In addition, handhole or access points are being designed with greater separations: 3,000 to 5,300 ft in length in some instances. Designers should evaluate the route and infrastructure and ensure that cable tensions are not exceeded for the cable placement process.

Common Mistake 5: Direct burial. For direct burying the cable, it is rare that the cable is plowed in one continuous length. Typically, there are a series of driveway or road crossings such that the cable is required to be placed in a figure 8. Follow those guidelines as mentioned previously. The cable should pay off in a linear fashion over the tractor and down to the plow chute. Cable guide rollers should provide an adequate transition to the plow. For multiple cables, the plow chute should have segments to allow for separate paths to ensure that cable(s) do not twist around one another and lay in even form.

Save Yourself From a Crush

These guidelines highlight the critical steps for the safe fiber optic cable placing operation. Please locate the cable manufacturer's specific installation procedures, which will detail more fully all of the steps required for a safe cable installation. In addition, a thorough understanding of placing equipment and tools is required. By adhering to these fundamentals and being mindful of the limits of the optical cable, a safe cable installation can be assured.

Matt Fitzgerald is a Product Line Manager at Corning Cable Systems. He has over 19 years of experience in product line management and cable quality. For more information, email matt.fitzgerald@corning.com [1] or visit www.corning.com/cablesystems [2].

Gerry Harvey is a Senior Projects Manager at Corning Cable Systems. He has more than 25 years of experience in OSP engineering/construction and fiber optic cable and cable assembly manufacturing. For more information, email gerry.harvey@corning.com [3] or visit www.corning.com/cablesystems.

What's your take on this subject? Leave a comment and get the conversation going.

Source URL: http://www.ospmag.com/issue/article/Avoiding-a-Costly-Crush

Links:
[1]
mailto:matt.fitzgerald@c
[2] http://www.corning.com/cablesystems
[3]
mailto:gerry.harvey@cor&#11

EXHIBIT

F

List of Cases I have provided testimony in the last four years:

1. CSX Transportation, Inc. v. AT&T CORP. Case No. 52 494 00513 13
2. AT&T Corporation vs. Bright House Networks, et. al. Case No.: 2014-CA-3496-O

Exhibit F